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IMPROVING THE PROFICIENCY OF MECHANICAL ACTIVITIES PERFORMED  
BY UTAH'S AGRICULTURALISTS.

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AGRICULTURE, \*FARMERS, \*JOB ANALYSIS, \*EDUCATIONAL NEEDS,  
AGRICULTURAL PRODUCTION, SURVEYS, QUESTIONNAIRES, UTAH,

THE MAJOR PURPOSES OF THIS STUDY WERE TO--(1) IMPROVE  
THE CURRICULUM IN AGRICULTURAL MECHANICS FOR THE PREPARATION  
OF VOCATIONAL AGRICULTURE TEACHERS AT UTAH STATE UNIVERSITY,  
(2) SERVE AS A GUIDE IN CHANGING AND DEVELOPING FUTURE  
COURSES IN AGRICULTURAL MECHANICS FOR ALL-DAY STUDENTS, (3)  
DISCOVER THE NEEDS FOR INSERVICE TRAINING PROGRAMS, AND (4)  
IDENTIFY AREAS OF INSTRUCTION WHICH MIGHT BE OFFERED AT THE  
POST-HIGH SCHOOL LEVEL. THE DATA WERE OBTAINED FROM 670  
USABLE SURVEY FORMS COMPLETED BY VOCATIONAL AGRICULTURE  
STUDENTS' PARENTS RESIDING IN 14 DESIGNATED COUNTIES. ONE  
VOCATIONAL AGRICULTURE TEACHER IN EACH COUNTY WAS SELECTED TO  
ADMINISTER AND COLLECT THE SURVEY FORMS. SOME FINDINGS  
WERE--(1) PARENTS OF HIGH SCHOOL VOCATIONAL AGRICULTURE  
STUDENTS DESIRED ADDITIONAL TRAINING IN ALL AREAS OF  
AGRICULTURAL MECHANICS, (2) 33 PERCENT OF THE FARMS WERE  
UNDER 100 ACRES IN SIZE, (3) AGRICULTURE TEACHERS WERE  
TEACHING MORE STUDENTS FROM PART-TIME THAN FULL-TIME FARMS,  
AND (4) 73 PERCENT OF THE FARMERS FELT THEY SHOULD PERFORM 15  
OF THE 16 LISTED FARM SHOP ACTIVITIES. SINCE UTAH FARMERS  
PERFORM MANY MECHANICAL ACTIVITIES FOR WHICH THEY ARE NOT  
PROPERLY TRAINED, ADDITIONAL TRAINING IS NEEDED IN ALL AREAS  
OF MECHANICS. INCREASED EMPHASIS SHOULD BE PLACED ON  
MECHANICAL ACTIVITIES TO SERVE THE GROWING NUMBER OF  
PART-TIME FARMERS. THE MECHANICAL JOB OPERATIONAL SURVEY FORM  
WITH AN INSTRUCTIONAL LETTER FOR PARENTS IS INCLUDED. (WB)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE  
OFFICE OF EDUCATION

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IMPROVING THE PROFICIENCY OF MECHANICAL ACTIVITIES

PERFORMED BY UTAH'S AGRICULTURALISTS .

by

Dr. Von H. Jarrett

**PURPOSE:** The major purpose of this study was to determine the following: (1) mechanical activities performed by farmers, (2) whether the farmers should perform these activities, (3) areas where additional training would be desirable, (4) effect of full-time and part-time farming upon the types of mechanical activities performed, (5) size and type of farming operations, (6) tools farmers possessed, (7) agricultural machines farmers had to perform mechanical activities, and (8) changes that should be made in the pre-service training curriculum.

The study was conducted for the following reasons:

1. To serve as a guide in changing and developing future courses in agricultural mechanics for all-day students in Utah.
2. To improve the curriculum in agricultural mechanics at Utah State University for the preparation of vocational agriculture teachers.
3. To discover the needs for in-service training programs.
4. To identify areas of instruction which might be offered at the post high school level.

The data reported in this study were obtained by means of an information form with the population determined by a statistical sampling technique. Fourteen counties were designated and one teacher was selected from each county. Each designated vocational agriculture teacher requested his students to have their parents complete the survey form. A total of 934 forms were distributed with 819, or 88 per cent returned, of which 670 or 72 per cent were usable.

**SUMMARY:**

1. Parents of high school vocational agriculture students desire additional training in all areas of agricultural mechanics.
2. Thirty-three percent of the farms were under 100 acres in size.
3. The returns indicated that instructors of vocational agriculture in Utah are teaching more students from part-time than from full-time farms.

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4. Thirty-four percent of the respondents classified themselves as general farmers. Fifty-six percent lived on their farms. Only five percent indicated that their annual sales and inventory increase exceeded \$30,000. Slightly more than half of the farmers had vocational agriculture in high school. Also, more than half of the farmers had shops on their farms.
5. Under the category of farm power and machinery, over 50 percent of those surveyed were performing 12 of the listed activities, while 16 of the activities were performed by more than 40 percent of the farmers. More than 50 percent thought that 21 of the activities should be performed.
6. Sixty-nine percent of the farmers indicated they should perform all activities listed on the survey form pertaining to farm buildings and conveniences.
7. Only three of the seven activities in soil and water management were being performed by more than half of the farmers.
8. Sixty-two percent of the farmers indicated that they should be performing all of the listed activities in farm electrification.
9. Seventy-three percent of the farmers felt they should perform 15 of the 16 farm shop activities.

**CONCLUSIONS:**

1. It is obvious that Utah farmers perform many mechanical activities for which they are not properly trained.
2. Additional training is needed in all areas of mechanics. The greatest needs are in electrification, farm power and machinery, buildings and conveniences, shop skills, and soil and water management.
3. Increased emphasis should be placed on mechanical activities to serve the growing number of part-time farmers.
4. The most immediate changes that should be made in the curriculum for the State of Utah are:
  - (a) More teaching in the area of electricity.
  - (b) Increased emphasis on service and maintenance of farm trucks.
  - (c) Additional training regarding internal combustion engines.
  - (d) More emphasis on farm buildings and conveniences.



# UTAH STATE UNIVERSITY

DARYL CHASE, PRESIDENT  
LOGAN, UTAH, 84321

COLLEGE OF AGRICULTURE

VEARL R. SMITH, DEAN

DEPARTMENT OF AGRICULTURAL EDUCATION

September 11, 1967

Dear Parent:

An effort is being made to improve and strengthen the Agricultural Mechanics program of instruction in the high schools of Utah. You are in a key position as a farmer and parent of a student to give information that will be invaluable in developing a program in high school to better meet the practical needs of farmers and farm youth. Many who will enter agricultural occupations other than farming will also benefit from practical instruction in Agricultural Mechanics.

The enclosed survey form has been made up so that you can furnish the desired information by placing check marks in the appropriate columns. These check marks will indicate which mechanical jobs you do, those jobs that you believe ought to be done on the farm, and those areas in which additional training is needed. By giving about fifteen minutes of your time, you'll be making a contribution that should result in a more practical and up-to-date course in Agricultural Mechanics.

With the data supplied on the forms, it will be possible to improve the teaching at the local level, better prepare teachers of vocational agriculture before they accept teaching assignments, and to give in-service classes to upgrade teachers on the job.

A numbering system is being used to assure the return of the survey forms. However, all forms will be stripped of numbers; and copies will be placed in a box so that all information will be confidential. With such confidential information from more than 1,000 persons over the State of Utah, some wonderful progress can be anticipated in a field that is so vital to success in agriculture.

Thanks for your part in improving the instructional program by completing the survey form.

Yours truly,

*Von H. Jarrett*  
Von H. Jarrett  
Associate Professor  
Agricultural Education

Enclosure  
VHJ:cat

## MECHANICAL JOB OPERATIONAL SURVEY

**INSTRUCTIONS:** Those you do, those you believe you ought to do, and those for which you need training. If you check "NO" in the column "Should Farmers Do This", it is obvious that you wouldn't suggest a need for training for that operation.

INSTRUCTIONS FOR COMPLETING PART I

Please check YES or  
NO to indicate whether  
or not you perform  
these jobs.

Please check YES or  
NO in these two  
columns for each job  
listed below. Your  
opinion is wanted.

Please check this column if you feel you need additional training for a particular job.

## Farm Power and Machinery

1. Diagnosing gasoline engine troubles
  2. Diagnosing diesel engine troubles
  3. Check compression of cylinders
  4. Adjust governor speed
  5. Replace piston rings
  6. Replace sleeve sets with new kit
  7. Grind or reface valves
  8. Measure crankshaft with micrometer
  9. Replace crankshaft bearing
  10. Replace clutch and adjust
  11. Install a carburetor kit
  12. Replace points and condenser
  13. Service a hydraulic system
  14. Determine characteristics of fuels and lubricants
  15. Recondition and overhaul tractor transmission
  16. Overhaul small engine (example: Briggs and Stratton)
  17. Determine horsepower rating of tractor using a dynamometer
  18. Determine economics in purchasing farm machinery
  19. Weld broken and worn parts on a machine
  20. Hardsurface machinery parts
  21. Calibrate grain drill
  22. Properly adjust combine

(Cont'd Page 2)

	DO YOU DO THIS?		SHOULD FARMERS DO THIS?		I NEED MORE TRAINING ON THIS.	
	YES	NO	YES	NO	YES	NO
23. Properly adjust plows. . . . .						
24. Calibrate field sprayer. . . . .						
25. Paint machinery. . . . .						
26. Winterize machinery for non-seasonal use. . . . .						
(Others) _____						

## Farm Buildings And Conveniences

1. Construct forms for placing concrete
  2. Determine proper ingredient for concrete . . . . .
  3. Finish concrete.
  4. Lay up concrete block.
  5. Apply roofing materials.
  6. Paint farm building.
  7. Construct major farm building.
  8. Construct and repair fences.
  9. Install ventilating system
  10. Apply insulating materials
  11. Install plumbing for livestock water system.
  12. Repair plumbing and bathroom fixtures
  13. Repair farm structures
  14. Lay out a building foundation.
  15. Read and understand blueprints
  16. Make a working sketch of a building.
  17. Plan and draw details of project (cattle chute) (horse trailer) (etc.) (Others)

## Soil and Water Management

1. Use a farm level . . . . .
  2. Lay out an irrigation system . . .
  3. Construct irrigation headgates . .
  4. Measure amount of irrigation water
  5. Construct farm pond. . . . .
  6. Lay out overhead irrigation system
  7. Lay out for a ditch lining . . . .

(Others)

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## Electrification

1. Plan electrical wiring needs. . . . .
  2. Install wiring between farm buildings
  3. Install main switch circuit breakers.
  4. Install interior electrical wiring. . .
  5. Select proper electrical wiring materials . . . . . . . . . . . . . . .
  6. Install switches and outlets. . . . .
  7. Install lighting fixtures . . . . .
  8. Select proper motor for farm use. . .
  9. Reverse rotation of motor . . . . .
  10. Hook up or wire electric motor. . . .
  11. Clean and service an electric motor .
  12. Install an electric motor properly. .
  13. Ground all electrical equipment. . . .
  14. Install electric fence. . . . . . .
  15. Install yard lights . . . . . . . .

(Others)

Farm Shop

1. Construct metal projects (feeders) (squeeze chute) (etc.) . . . . .
  2. Construct wood project for the farm . . . . .
  3. Repair major equipment on the farm . . . . .
  4. Sharpen own hand tools . . . . .
  5. Use arc welder . . . . .
  6. Make freehand sketches . . . . .
  7. Figure bill of materials . . . . .
  8. Use oxy-acetylene to cut and weld . . . . .
  9. Bend and shape hot metal . . . . .
  10. Construct sheet metal projects . . . . .
  11. Repair sheet metal . . . . .
  12. Solder sheet metal projects . . . . .
  13. Use reamer, taps, and dies . . . . .
  14. Use metal lathe . . . . .
  15. Replace handles in hand tools . . . . .
  16. Recondition hand tools . . . . .  
(Others)

## PART II

## **Major Pieces of Farm Machinery**

Please check \_\_\_\_\_ the number of pieces of farm machinery  
and shop equipment which you have on your farm.

(Con'd Page 4)

Shop Equipment

- |   | 1 | 2 | 3 or More |
|---|---|---|-----------|
| 1. Tractors . . . . .                       |   |   |           |
| 2. Combines . . . . .                       |   |   |           |
| 3. Grain-drills . . . . .                   |   |   |           |
| 4. Flows . . . . .                          |   |   |           |
| 5. Mowers . . . . .                         |   |   |           |
| 6. Rakes . . . . .                          |   |   |           |
| 7. Balers . . . . .                         |   |   |           |
| 8. Manure-spreaders . . . . .               |   |   |           |
| 9. Beet harvesters . . . . .                |   |   |           |
| 10. Cultivators . . . . .                   |   |   |           |
| 11. Feed elevators . . . . .                |   |   |           |
| 12. Milking machines . . . . .              |   |   |           |
| 13. Field sprayers . . . . .                |   |   |           |
| 14. Trucks . . . . .                        |   |   |           |
| 15. Self-propelled windrower . . . . .      |   |   |           |
| 16. Electric motors all sizes . . . . .     |   |   |           |
| 17. Small engines less than 5 h. p. . . . . |   |   |           |

1. Arc welder . . . . .
2. Acetylene welder . . . . .
3. Drill press . . . . .
4. Power saw . . . . .
5. Power grinder . . . . .
6. Paint sprayer . . . . .
7. Battery charger . . . . .
8. Air compressor . . . . .
9. Metal lathe . . . . .
10. Port. power hand saw . . . . .
11.  $\frac{1}{2}$  in. power drill . . . . .
12.  $\frac{1}{4}$  in. power drill . . . . .
13. Steam cleaner . . . . .
14. Power chain saw . . . . .
15. Set of mechanical tools . . . . .
16. Engine tune-up kits . . . . .
17. Engine overhaul tools . . . . .
18. Overhead lifting equip. . . . .
19. Volt meter . . . . .
20. Amperemeter . . . . .

Do you farm full time? \_\_\_\_\_ part time? \_\_\_\_\_. Do you live on your farm? \_\_\_\_\_

Size of farm in acres \_\_\_\_\_. Acres owned \_\_\_\_\_. Acres rented \_\_\_\_\_.  
\_\_\_\_\_

Did you have Vocational Agriculture in high school? \_\_\_\_\_ Age \_\_\_\_\_  
YES NO

Size of Home Farm shop \_\_\_\_\_ by \_\_\_\_\_ ft.

Major type of farming operation (such as dairying, poultry, livestock, cash-grain, livestock-grain, vegetable, fruit production, general farming, etc.)  
\_\_\_\_\_

(Write in type of farming)

Approximate annual sales and inventory increase for the year 1966. Under

\$1,000 \_\_\_\_\_ 1,000-5,000 \_\_\_\_\_ 5,000-15,000 \_\_\_\_\_ 15,000-30,000 \_\_\_\_\_

Over 30,000 \_\_\_\_\_

Comments: \_\_\_\_\_

VALUATION OF FARM EQUIPMENT AND LAND

Value of farm equipment and land \$\_\_\_\_\_. Value of land \$\_\_\_\_\_

On April 1, 1966